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ABSTRACT

While manufacturers have produced a wide variety of software said to be easy for even the youngest child to use, there are conflicting perspectives on computer issues such as ease of use, influence on meeting educational objectives, effects on procedural learning, and rationale for use with young children. Addressing these concerns, this practicum aimed to identify restrictive computer and software variables which increase the need for adult assistance, fail to complement the young child's mental schema, or limit spontaneous interaction. Data were collected on the availability of computer experiences away from school, use at home, and parental attitudes toward the inclusion of computers in an early childhood curriculum. Kindergarten children were observed at a computer learning center during a regularly scheduled free choice activity period. Observational data were collected on grouping characteristics, time on task, software operations, user interactions, sensory response manipulations, requests for assistance, and restrictive variables. The practicum revealed a need to coordinate contemporary philosophies of education with professional censure and the technological expertise of programmers, and to develop modified programs for young children which incorporate picture menus, consistent keyboard formats, uncluttered screens, error accounting, and contemporary letter/numeral configurations. (Author/RH)

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Identification Of Restrictive Computer
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IDENTIFICATION OF RESTRICTIVE COMPUTER AND SOFTWARE
VARIABLES AMONG PREOPERATIONAL USERS OF A COMPUTER
LEARNING CENTER

PRACTICUM I REPORT SUBMITTED TO THE FACULTY OF THE
EARLY CHILDHOOD EDUCATION PROGRAM
IN CANDIDACY FOR THE DEGREE OF
Ed.D. in Early Childhood Education

BY

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ABSTRACT

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Descriptors: Child Development/Children/Computers/Curriculum/Early Childhood Education/Educational Innovations/Kindergarten/Kindergarten Children/Microcomputers/Parent Education/Preschool Children/Preschool Education/Primary Education/Teacher Education/Young Children.

Recent developments of computer use, in the schools and at home, have encouraged manufacturers to create a wide variety of software lines which boast ease-of-use by even the youngest child. Professional research and commentary has directed its attention to the use of the computer as a learning tool in various educational environments; reporting conflicting perspectives on the emergence of computers in comparison to ease of use, influence on meeting educational objectives, effects on procedural learning, and rationale for use with young children.

The goal of this practicum was to identify restrictive computer and software variables which increase the need for adult assistance, fail to compliment the young child's mental schema, or limit spontaneous interaction. Prior to the implementation period, the writer collected data on the availability of computer experiences away from school, use at home, and parental value of its inclusion in an early childhood curriculum. Kindergarten children were observed, at a computer learning center, during a regularly scheduled free choice activity period. Observational data was collected on grouping characteristics, time on task, software operations, user interactions, sensory response manipulations, requests for assistance, and restrictive variables.

The practicum revealed a need to coordinate contemporary philosophies of education with the technological expertise of programmers and professional censure, to develop modified programs for young children which incorporate picture menus, consistent keyboard command formats, uncluttered screens, error accounting, and contemporary letter/numeral configurations.

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CHAPTER 1

INTRODUCTION

Community Description

Hammond, Indiana is a steel city located in the northwest corner of Indiana, bordered by the Chicago Metropolitan area on the west, Lake Michigan on the north and the city of Gary on the east. A 1980 census analysis reports the city population as 93,714, representing 88.3% white, 11.7% non-white and 2% foreign born. Projected census figures forecast a 5% decrease in population by 1990 due to expanded suburban housing developments, extensive industrial layoffs and new commercial businesses away from the city. (NIPSCO, 1982)

The city of Hammond provides jobs in various fields ranging from domestic and human service occupations to teaching, health care, construction and transportation operations. Major labor markets include steel manufacturing, oil refinement, engineering, utilities, and the production of railroad and industrial equipment. A myriad of steel, chemical, utility and printing industries have either closed or participated in major strikes during the past five

years, resulting in an increased unemployment rate.

Direct educational services, for public and private elementary, high school and college level programs, are provided within the city and neighboring communities. Nineteen public elementary and eleven high schools serve over 14,000 children in this northwest county. In addition, eight parochial schools and two private day schools prepare another 3,000 children with sound educational programs. Three local commuter colleges, Purdue University Calumet, Indiana University Northwest, and Calumet College are located within close proximity of the city. Degreed programs, at the graduate and undergraduate levels, are available in education, health care professions, engineering, business management, human service occupations and environmental studies. Each of these schools offer an extended summer enrichment program for academically talented, school age children, in computer science applications, environmental sciences, and the arts.

The Diocese of Gary Schools, a Catholic parochial school system which serves three northwest Indiana counties, maintains four elementary schools within the city of Hammond. The site for this practicum, Our Lady of Perpetual Help School, a private elementary school with an enrollment of 325 students in grades preschool through eighth, facilitates 199 families in the south Hammond area. The preschool was added to the regular Kindergarten through eighth grade program, during the 1983-1984 school year, to support the

community need for early education services and to locate and lock-in a dwindling parochial school enrollment. The school is operated on a shared tuition and scholarship basis by the parish community.

The educational staff at Our Lady of Perpetual Help School includes lay and religious ministers, teaching self-contained grade level classes at the primary level, and a departmentalized curriculum at the junior high level. Full time members of the teaching staff are licensed by the State of Indiana with Bachelor's or Master's degrees in Education. Several staff members are presently seeking or have earned advanced degrees in Education and Administration.

Group Identification

The Kindergarten program at Our Lady of Perpetual Help School offers experiences directed toward the growth of the whole child; his social, emotional, intellectual and physical development. This is accomplished through a carefully planned developmental curriculum which emphasizes concept and skill development in the areas of language, mathematics, science and Christian Education. Enrichment

experiences provide for gross and fine motor development, an appreciation of the arts, citizenship and learning through play. In every area, the support and growth of a positive self concept is of primary concern.

Instructional activities may be observed at four levels: 1) teacher directed experiences with the entire group or identified small groups, 2) self directed, teacher assigned activities to develop skills, 3) self choice learning activities within designated areas, or 4) play experiences with free manipulation and discovery oriented learning. By providing a balance of these learning situations, the young child is encouraged to develop independent thinking, evaluative and observational skills. Concrete learning experiences are planned during most of the instructional periods.

As an integral part of the program, the Kindergarten children attend Mass weekly, participate in a directed motor education program and are provided with the services of a music and movement teacher as well as a speech therapist. The integration of other forms of communication, such as an exposure to Spanish, sign language and computer technology, compliment the bounty of experiences at this level.

Spring registration generates the greatest number of student applicants for available class openings during the next school year. Kindergarten class sizes have ranged from 13 to 24, depending upon enrollment and split teaching time options with the preschool

program. During the 1983-1984 school year, 32 children were registered for the half-day Kindergarten program. Of these, 60 percent attended the schools' preschool program on a three or five day basis, 21 percent were enrolled in a community nursery or day care facility and 11 percent remained within the home environment to develop readiness skills. Most of the incoming children participated in a spring screening program, to determine special needs and skill ranges for grouping. Class sessions were determined by age, readiness skill abilities and special requests of working parents. The final class list generated ten boys and six girls for each two and one-half hour session, with an incoming age range of 5.3 to 6.0 years in the morning session and 4.11 to 5.0 years in the afternoon group. The mean age of 5.4 is noted as being lower than the previous years' tally of 5.7.

Among the children enrolled in the 1984-85 Kindergarten classes, 27 lived with both parents as an intact family unit, three lived with a single parent and two were within a step-parent home. Eleven of the thirty two children were the oldest in the family and one was an only child. Parental occupations varied from civil service and health care professions to industrial and community security positions. Several parents were attending college to learn or train for new occupations, as a result of local plant layoffs. Over half of the children indicated that their mother worked outside of the home, either on a full-time or part-time basis.

Author Identification

The writer has been involved in various areas of early childhood education for over thirteen years; as a preschool and Kindergarten teacher, Child Development Associate trainer, college instructor, substitute teacher, private educational consultant and workshop leader. During the 1984-84 school year, she served as Kindergarten teacher and primary level coordinator at Our Lady of Perpetual Help School in Hammond, Indiana and as guest lecturer at Purdue University Calumet Campus in the Department of Behavioral Sciences which offers degreed programs in Child Day Care.

As Kindergarten teacher, the writer was responsible for curriculum development, planning and implementation. During the 1983-1984 school year, she was responsible for the development of a preschool program for four year olds, as a split teaching assignment. This included training a full-time assistant, preparing instructional materials, organizing parent orientation, maintaining individual records, providing developmental assessments, preparing registration materials and constructing a handbook overview of the program.

As Coordinator of the primary staff, representing grades

preschool through second, the writer facilitated staff development as a liaison between the faculty and the administration, scheduled pre-service student teacher observations as requested by local colleges, attended faculty advisory meetings and supervised the daily operations of the building and academic affairs which were brought to her attention.

Additionally, the writer served as guest lecturer at Purdue University in the Department of Behavioral Sciences, where she teaches History and Philosophy of Early Education, Human Assessment, Early Childhood Administration and Curriculum Strategies to undergraduate Child Day Care, Developmental Psychology and Sociology majors. She is presently employed as a Visiting Assistant Professor at the same university, delivering undergraduate courses in early childhood curriculum development and supervising Practicum Student Teachers at the Purdue Child Care Center which provides drop-in and full daycare services for the campus, staff, faculty, and community population.

The writer's professional expertise has been developed through a variety of consultant services including Child Development Associate Trainer of Head Start sites and personnel, Kindergarten Curriculum committee member, guest speaker and workshop presenter at local, state and national conferences, curriculum and staff trainer for local preschool programs and cooperating teacher for pre-service teacher education field experiences. Her interest in and concern

about the use of computer education for the young child developed as she co-authored an article for the COMPUTING TEACHER on computer assisted instruction for teachers; which resulted in the purchase of a family owned system for use business applications, word processing and educational use by her two school aged sons. She has attended numerous computer workshops, accumulated an extensive personal software library and continues to examine the literature and software products for research, application methods and quality computer designs for use with young children.

CHAPTER II

PROBLEM IDENTIFICATION

Study of the Problem

The writer's interest in the use of computers in education, combined with the proposed mandatory inclusion of a computer literacy program in the elementary schools of Indiana by 1986 and the availability of an Apple II+ system, served as a foundation for ventures into effective classroom use to promote age-appropriate concept formation.

During the 1983-1984 school year an Apple II+ computer system, located in an adjoining administration building, was made available for scheduled use by the children and faculty of the school. The system had been donated to the parish administration for record keeping, correspondence and general office operations. The writer reserved use of the system, which included dual drives, color and monochrome monitor, and a printer, for beginning computer awareness skill development with small groups of Kindergarten children on a

weekly basis. Experiences with the computer keyboard, peripherals, and a limited selection of personally owned software led its way into continued use during the current school year.

The children's enthusiasm and patience with small group interaction time was overwhelming. They were introduced to the computer, dubbed CHARLIE and his software books, during a scheduled free choice time block. As they learned about the keyboard, its functions, terminology and the location of primary command keys, the writer began noting anticipated response errors which caused confusion among the children. The errors negated the purpose of providing user-friendly software experiences and independent discovery learning with the machine. Specifically, the following observations were made as children interacted with the computer and purchased software:

1. Software directives were often misleading and inconsistent in format among leading software companies. The children experienced difficulty with interpreting cursor messages such as ___, 2 , or ?.

2. Children routinely questioned input response procedures and felt anxious about the use of the return key after responding to a visual cue. Again, inconsistencies between input and return and input and automatic processing by the computer.

3. Text-like instructions often accompanied the screen graphics, necessitating adult intervention and interpretation. This

often resulted in a break of the attention and thought process continuity.

4. The location of the keys were inconsistent with traditional methods of exposure to the alphabet. The number keys, although presented in a 1 to 0 sequence, were easier to retrieve than the alphabet keys in a QWERTY form.

5. The multi-purpose use of several keys and symbol forms added to the confusion of locating the appropriate response. An alphabet letter key combined with a symbol key, such as N and ^, and the number 0 in close proximity to the letter O are special examples of this confusion.

6. The return and reset keys were often confused for one another. The young child sees the R at the beginning of the word form and assumes a meaning.

What began as an exciting endeavor into the use of a computer, turned into a frustrating "if...then" abstract instructional period on the use of varied software designs; a concept hardly understood by most children of this age! It was obvious the preoperational child could rarely deal with visual image inconsistencies and interruptions caused by the need for adult assistance and interpretation. The objective of leading the children into self discovery and the ability to wean them from direct adult assistance to self operation at a learning center became an unrealistic goal.

The writer decided that a closer examination of the manageability of computers with young children, in a classroom environment, must be pursued.

Problem Verification

The writer has provided early computer awareness experiences in her Kindergarten classroom for over three years, in varying degrees. What first began as a venture into observing the five year old and his reaction, response and interaction with this type of educational technology, quickly became part of an open-ended developmental program as a learning center.

The computer learning center, containing a keyboard, two disk drives, printer and two monitors, was placed on a mobile cart with shelves positioned for ease of use by the children. While enhancing eye-hand coordination, socialization patterns and inquiry skills, the computer provided drill and practice experiences in a number of identified academic tasks which were introduced through classroom curriculum materials. Small group instruction in the basic use of each software was provided, as needed, during scheduled free play time blocks in the classroom. Peer tutoring was observed as a valuable support for those who hesitated to request assistance from

the adult in charge. A slow weaning process, from direct adult supervision to requested assistance, was planned for problem solving strategies, peer group tutors and play behaviors to follow in a child oriented direction. This way, the teacher would be free to interact and provide materials to extend play tasks at other centers within the room.

Much of the available software failed to offer ease of manipulation and interpretation unless closely supervised by an adult. Including concrete learning manipulatives such as blocks and picture card dictionaries failed to compensate for the software inconsistencies. Other behaviors were noted at this time:

1. Children became less confident and approached new software cautiously or only upon invitation by the teacher.
2. Children routinely requested adult assistance and support in addition to their peer advise.
3. Children would elicit verbal and body motion responses to seek approval.
4. Time on task decreased as adult intervention was needed to reset program parameters or explain directives.
5. Confusion over multi-symbol keys continued.
6. Cluttered screen layouts and split screen designs were confusing to the young child, who is guided by his visual perceptions.
7. Accidental use of the reset key continued.

8. Yes/No and Y/N responses caused confusion.

9. The built-in time lapse for problem interpretation was often too short for the young child.

With this in mind, the author felt that some types of early childhood software were in dire need of restructuring. As stated by Grady (1983), good instructional software, like teaching, needs to be consistent. The knowledge of technical program development, combined with an expertise in child development, early childhood curriculum and observational evaluative skills of young children would lend itself to the development of accurate format design among manufacturers who sell software for use by young children.

Causes of the Problem

Recent developments of computer use in schools and at home have encouraged manufacturers to create a wide variety of software lines which boast ease of use by even the youngest child. (Bulkeley, 1984) In their competitive haste to enter this accelerating market, their failure to thoroughly consider the characteristics of the young child and to provide user-friendly controls have left them open to critical evaluation by users, many of whom are trained educators.

Zeitz (1983) verified that software developers are more concerned with which language to use and how to conserve valuable memory space, than whether the instructional design matches the ability or learning style of the user. Tipps (1982) added that the lack of understanding developmental learning and the deficient execution via software labeled age ranges, contributed to the poor quality of much of the current educational software. The young child's inability to interpret written directives, his egocentric behaviors, limited attention span, undeveloped fine motor skills and interpretation of visual cue formats become essential variables to consider as software is field tested for accurate marketability and endorsement by early childhood educators.

Relationship to the Literature

Professional research and commentary has directed its attention to the use of the computer as a learning tool in various educational environments. The literature presents conflicting perspectives on the emergence of computers in comparison to attitudes among users, influence upon meeting educational objectives, effects upon procedural learning and thought processes, and rationale for use with young children. Although Bulkeley's report of 1984 revealed

that a Chicago-based market research firm estimated 30% of the 1984 \$94 million home education software market was spent for children under the age of seven and that the volume was expected to double in 1984, the obvious lack of quality, age appropriate and user-friendly software for young children continues to plague the reviews and recommendations made by educational staffs around the country. (Hoot, 1983, Parker, 1982, Thomas, 1981)

The effects of computer technology upon preschool children has been examined by James Hoot (1983) in his elaboration upon educational promises and problems as young children explore computer technology within early childhood settings. Although this tool has an unlimited potential for expanding the minds of young children, Hoot affirmed that software development and educational claims continue to fall short of the promised cognitive enrichment for the school age child. Heard (1982) further attested to the absence of programs which take advantage of the potential for developing higher order thought processes, the deficiency of precedents in software contributions developed in accordance with child growth, development and learning theories, and the insufficient teacher training in expanding communicative and intellectual abilities of young children by way of the microcomputer. In essence, the promises and problems of utilizing high technology provide stumbling blocks for the advancement of what may be termed as the fourth communication revolution.

The benefits and rationale for including computer use among young children continues to be explored and linked to developmental theorists' views on child growth, development, and skill acquisition. Beyond fostering fine motor development and eye-hand coordination, computers allow children time to engage in symbolic representation of real objects; an essential stage presented by Piaget (1982). Some value has also been placed on the computers ability to foster emotional and social growth, as evidenced by Ziajka's (1983) amazement at observed attention spans, enjoyment and degree of social interactions generated by paired or small group work at interest center locations. This sense of controlled competence, which is developed as they play with the computer, serves as an instrument for the development of psychosocial autonomy as described by Erikson (1963).

Walker (1984) noted that thoughts about knowledge, learning and the computer's role in providing conditions under which personal intellectual models can be developed for many children today, is presented in Papert's MINDSTORMS (1980). Like Piaget, Papert believed that all children should have the pleasure of learning to enjoy, discover and acquire an individuality in acquiring knowledge. (Hilgard and Bower, 1975) Unlike Piaget, who may argue against the notion of the revolutionary potential of the computer with children who have not reached the period of formal operations and are unable to deal with abstract concepts, Papert claimed that exploratory

programming will restructure the way children think. (Rousseau, 1981, Smith, 1981 and Tursman, 1982)

A young child's ability to program a computer may be influenced by factors such as cognitive development level and spatial motor ability. Piestrup (1981) provided evidence of varying degrees of success in the use of interactive procedural language programs such as LOGO. Adjunct research by Piestrup suggested the difficulty in generating problem solving strategies and programming abilities as relying heavily upon reversibility of thought, concentration, developmental stage and study sample. With the widespread introduction of microcomputers among early education programs, techniques for computer communications, in which the child is an adaptive learner, must be designed to promote programming and other problem solving skills. (Munro-Mavrias, 1983)

Martin (1981) identified the use of computer programs as a medium for expressing individual learning styles among children. Her research examined the relationship between programming and cognitive styles which could, in turn, be confronted by both the learner and the teacher. In the research, a 'dribble file,' recording student's entries, traced the learning process of each child for an individualized learning pattern. Such an approach would enable software manufacturers, researchers and teachers to identify specific formats which invite errors or interfere with ease of use.

Diane Long (1983) overviewed the quickly expanding discipline

of computerism among young children, as an exciting area for early childhood educators. Guidance toward acquiring positive attitudes, understanding the functioning and abilities of a computer via verbal thinking and programming games, aid in the development of computerist thinking. Although appropriate software may be limited, causal relationships, logical thinking skills, an enhancement of self concept and an elevation of parental perceptions become significant factors in providing computer technology within the framework of early childhood education.

Although the examination of the issues reporting the young child's use of computers is at its inception, their ability to play with the machine is noted in studies by Zigich (1981), Munro-Havrias (1983), and Peistrup (1981) as negligible to their growth in basic readiness skill areas. To be user-friendly, computer programs should be easy to use; calling for uncomplicated execution of the topic presented, clear manual and screen instructions, effective keyboard strike and a simplistic peripheral design. (Ziajka, 1983, Grady 1983). The School Microcomputing Bulletin (1983) noted that although children may learn poor psychomotor habits by using the non-standard keyboards, such keyboards would be more consistent with the child's mental organization of letters and would draw on fine motor control feedback with a full depressed key strike than the typical QWERTY configuration formats of pressure sensitive boards.

Adult expectations and presence at a computer learning center

has been identified as impeding learning among young children. Swigger and Campbell (1981) observed children as less anxious and apprehensive about using the computer when an adult was not physically present. The writer agrees with this observation and attributes such assistance as detrimental to discovery learning. Concordant with Swigger's research (1981), teachers restrict the child's parameters of learning by their dominance over the machine and assessment of prescriptive limitations on skill readiness levels. Similarly, children's approval seeking motions interfere with their ability to engage in play-like activities, resulting in decreased time on task.

Results and Suggestions

Presently, a discrepancy exists between what the computer, as a tool for the mind, is capable of doing and what early childhood programs are allowing it to do. Research and attitudes toward the use of computers with young children are expressly concerned with the effects and the potential of the computer culture upon the development of the young child. Facilitators must exhibit competency in child development and computer literacy as they observe, forecast, apply and implement computer technology with

young children in various educational settings.

Developing quality software becomes dependent upon an exploration of how children think and interact with concrete objects presented in semi-abstract forms (Papert, 1980), their developmental characteristics (Clements, 1981, and Carlson, 1983); their orientation to technology (Taylor, 1980), and the philosophy of the educational environment. (Ross, 1983, Slesnick, 1983)

Goodman (1980) and Graves' (1981) research on examining records of mistakes, in order to guide decisions about educational direction, serves as a foundation for user-friendly software development in early childhood endeavors. They noted that "mistakes become an indication of a child's intellectual progress and communication process. An examination of the mechanics, rather than the environmental mental structure which may be conducive to further growth, becomes a stumbling block."

With the recommendation provided by Holznagel (1983), Jones (1983), Roblyer (1983) and Ziajka (1983), for evaluating and modifying educational software and its initial development, the writers' observational records of the proposed research should purvey guidelines for future research and development of software for use in early childhood education.

CHAPTER III

OUTCOMES AND EVALUATION

General Goals

The goal of this practicum was to identify restrictive computer software response and interactive variables, among preoperational users of a computer learning center, which was available for use during free choice activity sessions in a half day Kindergarten classroom. These variables, in turn, could serve as indicators for future software development and approaches for early introduction among facilities which serve young children. The writer examined how the computer keyboard and available early learning programs were used among kindergarten-aged children, by observing and recording error types, requests for adult assistance and sensory variables which are built into the observation tool. (See Appendix C)

The writer identified numerous user-friendly software stumbling blocks which interfered with the continued use of drill and practice materials. The continuous need for adult assistance to interpret, reset and encourage discovery skills, as a primary area of concern

warranted an in-depth examination of how children used this type of educational technology. The proposed practicum was designed to provide direct indicators and considerations for future software development which is more conducive to complementing the mental structures and confidence of the young child.

Terminal Performance Objectives

The proposal did not intend to alter present levels of performance among its' users, but rather to document existing forms of behavior for the benefit of ameliorating design and program construction among future software systems employed by young children.

Upon completion of the implementation approach, to identify user-restrictive variables, a summary will attempt to connote:

1. Survey data of participants adjunct experiences and parental posture on the use of computers in the home or within the school environment.
2. Practical documentation of interactive operations by the young child with varied software programs specifically designed for early educational use.
3. Comparisons among sex, grouping, concept drill

expectations, erratum variables, overtures for assistance and time on task.

4. Specific formats which restrict assimilation of the mental structures and independent discovery processes of the young child with high tech computer education.

Measurement of Performance

The writer contemplated various constructs for documenting the proposed issue. Direct inquiry interviews with children would provide limited responses based upon limited perceptions, inexperienced technological vocabulary and understanding of cause-effect actions based upon preoperational mental structures. Creating built in trickle files, noting the mechanics of user-friendly errors, as suggested in the research compiled by Martin (1981), Goodman (1980), and Graves (1981) was far removed from the writers existing programming skills as well as the requisite time element for actual development by a resource person.

An alternate form of gathering data, mailing questionnaires to Kindergarten teachers who incorporate computer learning centers in their curriculum program on a regular basis, would involve advertising to locate a sufficient sample who use similar products

and computer systems. Although this is an approach worthy of consideration, the time element restricted purposeful attempts at this time.

Direct observation of the stated problem was selected as an adequate measure of how participants operate, interact with and respond to computer materials.(Shade, 1983) An observation data tool was developed to collect pertinent data and document behaviors and activities of the kindergarten sample, as they select software for use at the computer learning center. A Kindergarten Korner Computer Survey preceeded the observation module, to identify those children who may have supplemental experiences with computers outside of the school environment and to exclude specific programs from the list of available software as a control for validity and extremes in data results.(See Appendix A)

CHAPTER IV

SOLUTION STRATEGIES

Possible Solutions

Educators in the field of early education have felt the impact of computers on contemporary curriculum strategies and the development of children; but continue to question which skills should be developed with this learning tool, how teachers should become trained to provide guidance in acquiring foundation skills and how to procure and create meritorious programs which enhance skills among young children. The limited amount of practical research on this topic confined contingent strategies to those identified by the writer as an eclectic approach to the proposition.

Zigich (1982) offered an instructional program for first grade children, to increase their awareness of the capabilities of the computer, to increase familiarity with its operation, to assist children in programming and running a program, and to tutor their peers during classroom computer time. The small group direction was similar to the observational plan developed by the writer; with work

time taking place during the course of regular free play periods built into the school day rather than an after school period. All enrolled Kindergarten children had access to the computer in lieu of a selective sample of four.

Discrepancies between approaches and interactions with direct adult assistance appear in the research of Swigger (1981) and Piestrup (1981). Swigger identified less apprehension among children when adult presence was limited, while Piestrup used observer presence as a source for set up and procedural instruction. The writer's identified problem conferred with Swigger's premise, yet questioned the validity of advertising inferences which site successful computer use by the child without adult intervention.

Developing software with icon formats, similar to many new business programs which use picture menus instead of printed commands, would ease the burden of interpreting printed format directives and split screen use. The writer's limited knowledge of graphic programming and inability to develop an expertise in this area or commission professional assistance to develop and field test an adequate amount of drill and practice, tutorial, creative or game software within a reasonable time frame made this option unsuitable.

Requesting strategies and guidelines on software development from major manufacturers, as a comparative study, would be time consuming, if not impossible for fear of copyright infringement and release of trade confidentiality. As Heard (1982) discovered, there

are no documented precedents to follow among publishing companies. Major companies admit problems with the software they are selling for use by young children, but they turn a greater profit with business oriented applications so research is being directed to the greater cry for updated applications. Employment with one of these major suppliers may have its greatest impact on the identified thesis.

Writer's Approach

The selected solution was one which could be used as a foundation for future research, development and application of hardware and software designs, which reflect a child's ability to use a computer based on preoperational visual and mental structures, interpretation and manipulation of text formats and hardware operations. The writer felt that by isolating errors and user-friendly formats, specific variables will be identified as interfering with the ease of use among young children. In turn, recommendations for appropriate software designs could be formulated for future development.

The writer observed Kindergarten children, who elected to use a computer learning center during scheduled free-choice activity

periods. These periods were provided at least three times a week for one-half an hour, during the designated implementation period.(Beeson, 1983) The entire group was provided with choices of alternate developmental play activities during this time, including creative arts, dramatic play, fine motor table toys and open ended discovery materials.

A computer use survey (Appendix A) was distributed to all households of children participating in this study, to determine the availability of computer experience outside of the classroom, interest in computers in early education, and the amount of time and type of use in the home. This background provided indicators for ease of use by individual children and aided in exempting specific software titles from the present library; controlling for previous experiences with the program on a one-to-one adult and child use basis.(Nieboer, 1983)

The observational system (Appendix C) has been designed in accordance with a variety of designs and criteria for the development of behavioral observation systems. Relevant behaviors were built into the observation tool for measurement according to frequency of occurrence or time on task, using a tally method. Pertinent information, such as successful trials, peer grouping, interaction and response types, and requests for assistance were recorded and compared to variables such as sex, grouping, program type, error type and time on task. The data was analyzed and

reported in narrative text form, to identify those variables which increase or interfere with use by the young child.

A variety of software forms were offered, representing diverse learning approaches.(Spencer, 1983)

1. DRILL AND PRACTICE programs are designed to practice information which has been introduced in class. The programs often resemble flashcards, provide visual rewards for correct responses and are often paced according to individual learner parameters.

2. EDUCATIONAL GAMES present skill development at a fast rate. These programs are game versions of drill and practice activities.

3. CREATIVE programs encourage exploration of tools. Users are free to discover and learn, play and create without a prerequisite mastery skill level.

4. TUTORIALS teach concepts or skills like a private tutor. These programs are often self-paced and can be a very creative way to learn subject matter. Some use of printed word forms are included.

Decorative file folders were assembled to serve as storage and retrieval units for each of the following specific program title disk(s) and supportive manipulatives for use during the implementation period of data collection.(Appendix B) Seven additional pieces of software were eliminated from the original

proposal list, as they showed up as part of several home software libraries. Their titles appear in Appendix B: Software Titles.

ALPHABET ZOO - children strengthen letter recognition skills as they associate letters of the alphabet with the sounds they represent.

JUGGLES WINDMILLS, RAINBOWS AND BUTTERFLY - experiences with directionality, spatial relations and keyboard quadrants as the user responds to graphic forms.

COUNTING BEE - basic numeric and quantitative concepts are reinforced as users count blocks, moving circles and mixed shapes, work with measurement units of volume, and experience simple addition and subtraction using visual object forms.

KIDS ON KEYS - familiarizes children with the computer keyboard as they learn to identify numbers, letters and words as they associate them with visual images presented on the screen.

LET'S ADD, LET'S SUBTRACT - basic drill, practice and reinforcement in grouping objects

MUPPETS LEARNING KEYS - an alternate keyboard for early learners. The program disk provides self-discovery experiences with numbers,

counting, letters, sounds, colors and keyboards functions.

FACEMAKER -helps children become familiar with computer fundamentals as it helps to improve memory and recall skills and a form of basic programming.

ODD ONE OUT - color graphics, animation and sound motivates children to examine relationships and discriminate between pictures, words, numbers, letters, shapes and colors as they build basic classification skills.

EASY AS ABC -picture menu selection of multiple skill games on letter recognition through letter match sequences, dot-to-dots, and missing letter trials.

Program Steps

1. The schools' Apple II+ system, which contained a keyboard, color and green monitors, and printer on a portable cart, was reserved for scheduled free choice activity periods. The selection of software was drawn from the writer's personal library, as the schools' provisions of early education software was

non-existent during the practicum period.

2. Data from the parent survey was collected and used primarily as a means of eliminating specific program titles from the resource file and as a way of determining those who have had supplemental computer experiences..

3. Decorative storage folders were prepared to house individual software disks and supportive manipulative materials. Two instructional periods were provided to introduce the use of the file system, handling the materials, and to set up limitations. Subsequent whole group periods of instruction were held to introduce new software titles and format.

4. The data tool forms were duplicated and all recording forms and data collected were removed from the school building and stored secure location for the protection of sample identification.

5. A parent volunteer list was created to enlist classroom helpers during the free choice time block, in case frequent interruptions prevented collecting observational data of computer use. Due to the small group size and classroom arrangement, this list was never drawn upon during the three month implementation period.

CHAPTER V

RESULTS AND RECOMMENDATIONS

Home survey results

A computer survey was sent home, to each family of a kindergarten child who participated in the study (Appendix A), to gather information about at-home use, parental interest, and the value of a computer awareness curriculum within an early education program. In addition, the writer used information from questions one, six, seven, and eight as variable controls when examining observational data of user ease in the classroom by eliminating familiar software from use during the classroom study. (See Appendix D)

Of the thirty-one families, twenty four or 77.4 percent of the participants returned the computer survey within the first two weeks of the program time-line. This represented an 83 percent response rate among families with kindergarten girls, and a 78 percent response rate among kindergarten boys. Although the survey form refrained from requiring family identification, the writer noted the

family name, sex, and date on several unidentified forms, to secure information on variables such as household ownership, use, and response/return rate among male versus female users. Secondly, it was felt that the information would provide a source for parent helpers as classroom assistants at the computer center. No follow-up letter was formulated, to assure a higher response rate, as the writer felt a need to respect the confidentiality of home activities and the right to refrain from releasing such records. The possibility of collecting the survey data from personal interviews with the children was considered; however, it was determined that a child's view of a computer often related to home video game machines or video recording systems.

Preliminary home survey results indicated minimal use of computers by the kindergarten child, away from school. These results are similar to an August, 1984 article in the Wall Street Journal stating that relatively few children are exposed to computers in the home due to the cost comparison of the computer programs to free television. (Bulkeley, 1984) Parents are reluctant to buy into technology as an educational tool for the young child.

Although computer literature (McKay, 1985) suggests inequities based upon gender, the report of home computer ownership or use outside of school among girls in this sample exceeded that of male participants; yet, actual time-in-use, among females, was infrequent compared to male users in the study.

The primary use of a home computer, as a source for home entertainment, using select arcade type programs, or as an educational tutor for primary subject and skill drills, provided evidence of its value as a learning tool in an early education curriculum by over 87 percent of users.(See Appendix D) Clearly, at home use is limited at this time, indicating a continued need to educate the parent community, to work toward provisions for quality software, and to establish realistic goals and guidelines for both home and school management.

An itemized summary from the survey disclosed the following:

1. Forty-one percent of the sample used computers either in their home, at work, or at a friend's home. Fifty-seven percent of the boys and forty percent of the girls predicted future plans for a home computer. Ten percent of the girls indicated no future plans for such a purchase.
2. Two thirds of the male homes were equipped with either Apple or Commodore computers, while only one-third of the female homes housed these popular brands.
3. The length of home ownership was reported as one year or less among eighty-three percent of boy family owners and as two years or more among eighty percent of the girls reporting an at-home

computer.

4. Availability of peripherals, such as printers, alternate keyboards, modems, graphics tablets and voice synthesizers, were reported more often in the homes of girls than boys. The use of disk drives and tape drives were equally reported among boys. Television sets were used as monitors with at least one-half of all users.

5. Time spent at the home computer (daily, weekly, infrequently) was equally represented among boys; infrequency dominated the selection for girls.

6. Adult assistance at the computer took place in over eighty percent of the time in all households which report use on a daily or weekly basis.

7. Major areas of assistance were in booting the system, reading the text, setting up parameters, or trouble shooting errors made by the children.

8. Arcade type games and math drills are prevalent among most-liked software categories. Involved strategy games and repetitive, single concept program drills are among the least liked.

9. Adults reported using the computer as a source of entertainment or as a tutor. Children spent equal amounts of computer time on educational drill and practice programs and entertainment simulations.

10. A small number of homes either subscribe to or regularly read computing periodicals. Those that do, tend to select magazines designed for a particular brand or one specifically for home and family use.

11. A value for the inclusion of computer experiences within the early childhood curriculum, at the practicum site, was expressed by eighty-seven percent of the respondents; several remained uncertain of its value or felt they couldn't comment on its effectiveness at this time.

GROUPING AND TIME ON TASK

Guidelines, for limiting group size within classroom learning areas, were established during the first few weeks of the school year, in order to accommodate and control egocentric behavior

patterns, to rotate interest area usage and to maintain supervision with a one-to-sixteen teacher ratio. This grouping restriction was maintained for the computer learning station, on a first come basis as two workers interacted directly with the learning tool; onlookers were not discouraged. A chalkboard list was created, as onlookers vied for a movers place or patiently consented to wait it out at another center until an available space was ready. Many children actually conceded to be placed on a waiting list for a future day; creating a self initiated rotation schedule which enhanced reading readiness skill development.

The writer observed various characteristics of the groups which formed at the computer learning station. All girl groups tended to be most persistent in securing computer time; interacting with the computer or waiting to use the machine, to the exclusion of other classroom activities. These findings were similar to the Lipinski study (1984) of four year old preschoolers free play choices when a computer was present in the classroom. Beeson (1983) also noted a statistical difference between males and females in the choice of the computer activity. Similarly, the boys in this study inquired in a less demanding manner, often conceding to work at other tasks within close proximity of the computer. Mixed groups formed during the end of the week, when creative art stations and music center activities upstaged the computer area, or as noted in a study of computers in the early education classroom by Taylor (1983), a place

was available for parallel or associative play learners to experience low stress, non-isolation type socialization tasks. In accord with Swigger (1984), previously established social groupings were not interrupted during this time; most of the all girl or all boy groups routinely selected a friend as a computer task partner.

Observational data revealed diversified results for time on task totals, among all groups. All girl groups, of three or less direct users, averaged fifteen minutes per stay, while all boy or mixed groups employed thirteen minutes per session. The differences among these groups were not directly related to age factors, as the average age among all boys and girls in the identified group fell within a one month differential. Maturity, socialization skills and reading readiness may be considered as a contributing variable.

Younger aged boys spent less time at the computer, for all program types; attesting to their limited attention span, distractibility and need for close facilitator supervision and assistance with most computer operations. Those children who were identified as entering school with relatively few readiness skills in decoding symbolic letter and number forms usually avoided contact with the computer; encouragement by an adult as task partner or by an advanced peer as a tutor proved helpful in most cases.

All groups maintained the selective use of supplemental manipulative materials, such as cubical counting blocks, alphabet sequence posters, number lines, picture-word cards and letter case

puzzles, to reinforce their problem solving efforts. Likewise, spontaneous verbal responses, interactive forms of praise, and peer tutoring were visible within each cluster.

Interactive Variables

A basic understanding of computer operations and the ability to transfer patterned responses among varied forms of software presentations is a task which demands an advanced level of logical thinking skills which are often found within the realm of an older primary child. Having limited experiences with abstract program materials, the kindergarten child could often be observed testing discovery skills in a hit-or-miss fashion, when choosing not to enlist the help of an adult facilitator.

Following brief, weekly, whole group instructional periods, designed to reinforce basic disk handling, on/off procedures, and terminology, an introduction to single pieces of software allowed for the development of varied operational format experiences. Colorful picture and word coded file folders housed various software titles for self selection. (See Appendix B) Maturing auditory memory skills supported this technique as a form of teacher directed instruction which would lend itself to future self-initiated tasks.

The use of pressure sensitive keyboards, as found on many inexpensive handheld models, demand accurate fine motor control for striking keys or executing commands. Typewriter-like designs, with distinct depression strike, adequate spacing between keys and clear, uncluttered numeral and letter forms, provided for ease of use among most early users. Child-like, one-fingered stroking seldom generated errors on this type of keyboard. Occasionally, the built in repeat function was generated by the uneven finger pressure, typically found among young children.

The QWERTY typewriter organization of keys became a challenge for children who were beginning to master symbolic order among numeral and letter forms. The proximity of the zero key and the letter O key, the similarity in visual form of the RESET and the RETURN key, and the printed form of the letter I as l and its confusion with the letter form L, were identified as organizational distractors for young children, as confirmed in earlier observations.

Modified keyboards, especially designed for early learners or special needs children, such as the Muppets Keyboard, support the endeavors of young children by designing letter and numeral keys in sequential order, using picture symbol keys for commands and skill drill and practice through familiar television character routines. Although pressure sensitive, its adequate key spacing and mobility provided for error free use with specific programs.

Sensory Variables

Screen interaction response forms were often dependent upon the type of program and the need or selection of supplemental manipulatives to enhance concrete operational thought experiences. Upper shelf placement of the monitor restricted tactile tracing of symbol forms, pathway planning strategies, predicting animated movements, and counting objects by pointing and touching. It was found that the positioning of the monitor on the keyboard shelf or on the keyboard base increased direct, within-reach, spontaneous use of the screen as a concrete learning tool.

Software learning activities, presented as drill and practice games, often necessitated a concrete reference to an alphabet or numeral order adhesive strip, sequential puzzle worm, or poster set. Programs offering practice in matching letter forms, dot-to-dot sequences, missing letter or numbers, or plotting sequences, were supported by this type of self-check by the children. Besides tactile interactions with the computer, the practicum disclosed user reactions to varied reinforcement constructs.

Sound accompanied by bold color picture sprays often elicited joyous reactions. Printed forms of screen rewards or scored

tabulations decreased the spontaneous pleasure of a correct response, as non-readers would need adult assistance to read the word or phrase. Timed on-screen word rewards would frequently be missed by the facilitator who was occupied elsewhere in the room. Game-like rewards, which interrupt the flow of the learning sequence, usually demanded another skill: timed reaction, confusion over number of trials, and reaccess to the regular program selection. Brief graphic presentations, accompanied by a tuned response, provided an adequate indicator of success, which encouraged additional trial attempts by the young child.

Menu Forms

Introductory software credits, menu and parameter options and printed directives became principle sources for delays in program access. These unavoidable forms of advertising, although entertaining when imbedded with colorful movements, tunes, and timed progression, added to the frustration of waiting to interact with the program; a skill which requires a matured ability to attend to the task for up to two minutes.

Menu forms, among the selected programs designed for use among young children, demonstrated little consistency between

manufacturers. Picture menu screens, displaying a sample program task, were easiest to use among pre-readers. Cursor indicators could be moved to the selection, permitting easy retrieval and independent operation of the picture menu. The Springboard series typifies this early learner variable. Numbered menu formats, containing a series of selections accompanied by a picture clue, fared well with most children. This combination of pictures and words supported visual recall skills while providing reinforcement of phonetic skills.

Extended menu requests, for skill level, number of players, name(s), or sex, restricted management by the young child without adult support. Specialized formats containing (S)tart, (L)evel, or (G)ame screens could be added to the list of menu distractors. Programs designed with special access commands for adult use to reset skill levels or organize the sequence of programs, permitted user-friendly operations. Attending to the young child's short attention span, his/her need for immediate manipulation and gratification of actions, and the clarity of appropriate cognitively-oriented computer presentations will provide for the future success of early childhood software analysis and development.

Assistance Variables

The most frequent request for assistance incurred reading text menus, briefing on variations in user input operations or resetting learner parameters. Weak mastery of D/B or W/M letter forms, unclear screen graphics of N/U-W/N-U/U and M/W, the keyboard configuration for L and I, and the use of letter keys in place of existing arrow keys, led to persistent input errors. Few programs had built in error accounting for keys which were depressed too long, accidental spacings, or unrealistic numeral or beginning letter input. Each of these, in addition to others presented in this report, warranted continual facilitator supervision.

Recommendations

The impact of computer technology upon early childhood program development is contingent upon the successful integration of contemporary philosophies of education, the application of developmental research, and the evaluation of existing software designs. Although it can be acknowledged that the young child

delights in computer graphics, music, and creative peripherals, educational specialists must examine the content, mode of presentation, and quality of individual pieces of software before yielding to pressures of parent groups or advertising promotions. In order to insure that children are ready (or need) to join the computer revolution, an emphasis on concrete play experiences and self-directed discovery learning must continue. A common language must be developed to build an interactive, personalized relationship between the computer and the child. (Bowman, 1983)

The writer suggests that manufacturers of software for young children become accountable for basing their user-friendly strategies on the developmental characteristics of early childhood cognition. Programs that feature uncluttered screens, error accounting, picture menus, use of arrow keys for directional orientation skill games and contemporary letter configurations on alphabetical keyboards would increase the early learners ease of use and confidence in approaching innovative educational technology. Educators should be encouraged to share their observational and anecdotal records, management strategies, and software evaluations, with colleagues, school boards and community parent groups, through newsletters articles, workshop presentations, or enrichment meetings. Invitations to observe "children in action" at the computer may be an excellent way for reluctant or apprehensive staff members to weigh the available research with the realities of use

within an early childhood curriculum.

Parents and teachers should approach computer technology as an optional form of instructional media for supplementing hands-on learning, teacher facilitated instruction, and multi-sensory interactive education. The design and use of computer systems, within the home environment or school curriculum, can serve as an extra dimension to enhance the child's acquisition of cognitive experiences. (Taylor, 1983)

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HOME SURVEY



KINDERGARTEN KORNER



COMPUTER SURVEY

Dear Parents:

Computer awareness and literacy is becoming one of the educational buzzwords of the decade, as children learn more about computers and learn with computers. The Kindergarten children are so excited about using CHARLIE the computer, experimenting with the Muppets Keyboard, and learning with LOGO the turtle.

To help us provide challenging activities for your Kindergarten child, as we build computer awareness foundation skills, we are collecting more information about each child's previous or ongoing at-home computer experiences.

Please help us in this endeavor by completing the attached survey and returning it to school promptly. Your cooperation and interest will be appreciated. If you should have any questions, please feel free to ask!

Warmly,

Mrs. Diane K. Kozubal
Kindergarten Teacher

Please check all which apply:

1. Does your household ☐ a. own a computer
☐ b. use a friend or relative's computer
☐ c. have future plans for computer
☐ d. have no plans to have a home computer

If you check c or d please skip to questions 10, 11, and 12.

2. If you own or plan to purchase a computer, please indicate the brand name.

- | | |
|---|--------------------------------------|
| ☐ a. IBM model | ☐ h. Acorn |
| ☐ b. Apple model | ☐ i. Texas I. |
| ☐ c. Adam | ☐ j. Franklin |
| ☐ d. Kaypro | ☐ k. Osborne |
| ☐ e. Commodore | ☐ l. Timex |
| ☐ f. Radio Shack | ☐ m. Other |
| ☐ g. Atari | |

3. How long have you owned or had access to a computer?

- ☐ a. One year or less
☐ b. Two years or more

4. What kind(s) of peripheral hardware does the system have at this time?

- | | |
|--|--|
| ☐ a. disk drive(s) | ☐ f. printer |
| ☐ b. tape drive(s) | ☐ g. modem |
| ☐ c. color monitor | ☐ h. graphics tablet |
| ☐ d. monochrome monitor | ☐ i. joysticks |
| ☐ e. TV as a monitor | ☐ j. alternate keyboard |

5. How often does your child use a computer, outside of school?

- ☐ a. daily
☐ b. weekly
☐ c. infrequently

6. How often do you assist your child's use of the computer?

- ☐ a. always
☐ b. sometimes, as requested
☐ c. rarely
☐ d. never

7. What type(s) of problems do(es) your child experience as he/she uses the computer?

- ☐ a. loading the disk, cassette
- ☐ b. booting the sytem
- ☐ c. understanding response formats
- ☐ d. reading the text
- ☐ e. key location
- ☐ e. other _____

8. What program(s) do(es) your child enjoy the most/least? Please list by title.

Programs most enjoyed:

Programs least enjoyed:

9. How is the computer used by the adults and children in your household?

Adult Use:

- ☐ a. business
- ☐ b. entertainment
- ☐ c. tutorial subjects
- ☐ d. word processing
- ☐ e. data base
- ☐ f. programming
- ☐ g. other _____

Children's Use:

- ☐ a. educational
- ☐ b. games
- ☐ c. word processing
- ☐ d. graphics
- ☐ e. other _____

10. Do you subscribe to or read any computer periodicals? Yes/No Please list.

11. Do you feel that computer awareness instruction is a valuable part of an early education program?

- ☐ a. yes
- ☐ b. no
- ☐ c. unsure

12. Please add any comments regarding the use of computers in the home or at school. All information will be held confidential! Thankyou.

SOFTWARE TITLES

Files APPENDIX B

Page 1

TITLE	COMPANY	AGE RANGE	TUTORIAL DRILL PRACTICE	COLORS	STORY FORMATION	ORDER	MATCHING	CLASSIFY
ALPHABET ZOO		3 TO 8	D P	X		X		
KINDERCOMP	SPINNAKER	3 TO 8	D P	X		X	X	X
JUGGLES WINDMILLS	LEARNING	3 TO 8	T D P	X			X	
JUGGLES RAINBOWS	LEARNING	3 TO 8	T D P	X			X	
JUGGLES BUTTERFLYS	LEARNING	3 TO 8	T D P	X			X	
COUNTING BEE	EDUMARE	3 TO 8	D P	X			X	X
PITTER PATTER		3 TO 8	D P			X	X	
KIDS ON KEYS	SPINNAKER	3 TO 9	D P	X				X
LET'S ADD LET'S SUBTRACT	LANE ROBBINS	3 TO 8	D P					
COUNT THE SQUARES	LANE ROBBINS	3 TO 8	D P	X		X		X
FIND THE NUMBERS	LANE ROBBINS	3 TO 8	D P				X	
FIND THE LETTERS	LANE ROBBINS	3 TO 8	D P			X	X	
MUPPETS KEYBOARD	KDALA	2 TO 7	D P	X	X		X	
FACEMAKER	SPINNAKER	4 TO 12	D P			X	X	X
SPELLING BEE WITH READING PRIMER	EDUMARE	4 TO 12	D P				X	X
ODD ONE OUT	SUNBURST	4 TO 12	D P				X	X
HEY DIDDLE DIDDLE	SPINNAKER	3 TO 10	D P			X		

TITLE	LETTER SOUNDS	COUNTING MEASURE	CREATIVE	LETTER NAMES	NUMBER NAMES	KEYBOARD SKILLS	MEMORY SKILLS	WORD FORMS
ALPHABET ZOO	X			X		X		X
KINDERCOMP	X	X	X	X	X	X		X
JUGGLES WINDMILLS			X			X		X
JUGGLES RAINBOWS			X			X		X
JUGGLES BUTTERFLYS			X			X		X
COUNTING BEE		X			X	X	X	
PITTER PATTER	X	X	X	X		X		X
KIDS ON KEYS	X	X	X	X	X	X	X	X
LET'S ADD LET'S SUBTRACT		X			X	X	X	
COUNT THE SQUARES		X			X	X		
FIND THE NUMBERS		X			X	X		
FIND THE LETTERS				X		X		
MUPPETS KEYBOARD	X	X	X	X	X	X		X
FACEWAKER	X	X	X	X		X	X	X
SPELLING BEE WITH READING PRIMER	X			X	X	X		X
ODD ONE OUT	X	X			X	X	X	X
HEY DIDDLE DIDDLE			X			X	X	X

APPENDIX C

Observational Data Sheet

Date:
 Session: AM-PM
 Time: IN-OUT
 User: M-F

Software Title:
 Type: DP-T-C
 Menu Selected:
 Prompt Type:

Groupings: Solitary-Peer M-F
 Handedness: R-L
 Assigned-Self Choice
 Change: Selection-Center

Trials: + -
 Keyboard: Regular-Modified
 Reinforcement Type:
 Other: _____

USER INTERACTION VARIABLES

dual purpose key confusion
 hit wrong key
 respond without return
 respond with return unnecessary
 repeat key error
 location of key letter-number
 response time lapse
 hit reset key
 hit space bar
 unknown error
 other:

SENSORY VARIABLES

verbal comment + -
 expressive + -
 tactile on screen
 manipulative usage
 attention distractor

ASSISTANCE REQUEST(S)

parameter reset
 disk operation/boot
 program selection
 key location
 menu interpretation
 text/directive interpret
 program interruption
 repeat error-correction

COMMENTS-OBSERVATIONS

APPENDIX D
HOME SURVEY RESULTS

Question Content		Response: Boys(14/19) Girls(10/12)	
1. Own a computer		4	2
Use a friend's		2	3
Future plans for purchase		8	4
No plans for home computer			1
2. Type owned:	IBM		1
	APPLE	2	1
	COMMODORE	2	1
	ATARI	1	
	TEXAS INSTRUMENTS	1	1
	TIMEX		1
	ZEROX		1
3. Ownership/use time:	1 year or less	5	1
	2 years or more	1	4
4. Peripherals in use:	disk drives	2	3
	tape drive	2	
	color monitor	1	3
	monochrome	1	
	TV as monitor	3	2
	printer	1	2
	joysticks	3	2
	alternate keyboard		2
	graphics tablet		1
	modem		1
	speech synthesizer		1
5. Time in use:	daily	2	
	weekly	2	
	infrequently	2	5
6. Assist child's use:	always	2	2
	sometimes	3	2
	never		
	no response/?		1
7. Problems/assistance requests:			
	loading	1	
	booting	2	
	response format		1
	reading text	2	2
	key location/use	1	1
	other misc.	2	

APPENDIX D
HOME SURVEY RESULTS

QUESTION CONTENT		Response: Boys(14/19) Girls(10/12)	
8. Programs available:	<u>Most liked</u>	<u>Least likes</u>	
	Omega Race	Vic Avengers	
	Alphabuild	Juggles Butterflies	
	Linking Logic	Kindercomp	
	Home Babysitter	Storybook	
	Tooth Invaders	Tank Command	
	Alphabet Zoo	Defender	
	Mission Minus		
	Counting Plus		
	Facemaker		
	Apple Presents Apple		
	Instant Zoo		
	Gertrudes Puzzles		
	Delat Drawing		
	Needle		
	Centipede		
	Frogger		
	Easy Learning Fun		
	Math and Reading Games		
	ABC Man		
	QBert		
	Video Olympics		
9. Use: Adult	business		1
	entertainment	4	2
	tutorial	1	2
	word processor		1
	data base		1
	programming	1	1
	Child(ren)	educational tutor	5
		games	5
		word processing	
		creative graphics	1
10. Subscriptions to Computer periodicals	Family Computing		
	Home Computing		
	Nibble		
	PC World		
	Computer Tech		
11. Value of computers in early education	Texas Instruments Magazine		
	yes	13	8
	no		
	unsure	1	1